

Remarks

The Applicants have amended the Specification to provide proper idiomatic English and to correct a subheading.

The Applicants acknowledge the rejection of Claims 1 - 11 and 13 - 23 under 35 U.S.C. §112. The Applicants have amended Claim 1 to recite “polyethylene terephthalate” in accordance with the Examiner’s helpful suggestion. Also, the appropriate claims have been amended to include the proper language with respect JIS L0804. The Applicants also enclose a copy of JIS L0804, and a copy of The Standardization and Analysis of Hand Evaluation for the Examiner’s convenience.

The term “denim-like” has been deleted from all of the claims in accordance with the Examiner’s helpful suggestions. The Applicants accordingly respectfully request withdrawal of the 35 U.S.C. §112 rejection.

The Applicants have also amended Claim 1 to contain the subject matter of Claims 4, 11 and 12. Claims 4, 11 and 12 have accordingly been cancelled.

The Applicants acknowledge the 35 U.S.C. §102 rejection of Claims 1 - 10, 19 and 20 under 35 U.S.C. §102 as being anticipated by Beaty. In as much as Claim 1 has been amended to contain the subject matter of Claims 11 and 12, the Applicants respectfully submit that the rejection based on Beaty is now moot. Withdrawal of that rejection is respectfully requested.

The Applicants acknowledge the rejection of Claims 1 - 3, 8 - 17 and 19 under 35 U.S.C. §103 as being obvious over Hayashi. In as much as Claim 1 has been amended to include the subject matter of Claim 4, the Applicants respectfully submit that the rejection is now moot. Withdrawal of the 35 U.S.C. §103 rejection based on Hayashi is respectfully requested.

In light of the forgoing, the Applicants respectfully submit that the entire application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,



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THE STANDARDIZATION
AND
ANALYSIS
OF
HAND EVALUATION
(2nd. Edition)

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CONTENTS

	PAGE
CHAPTER I. HISTORY OF THE COMMITTEE.....	1
1. Publication of the H.E.S.C. STANDARD OF HAND EVALUATION, The First Edition	1
1.1 A confused situation of hand evaluation in Japan when the committee started	1
1.2 The conception of hand	1
1.3 The organization of the committee.....	2
1.4 The mechanical measurement of fabric properties.....	2
1.5 Members of the committee who contributed to the establishment of the standard of the hand evaluation	3
1.6 Contribution from the companies for the publication of THE H.E.S.C. STANDARD OF HAND EVALUATION, the first edition	4
2. Publication of THE H.E.S.C. STANDARD OF HAND EVALUATION, the second edition.....	4
3. Publication of THE STANDARD OF HAND EVALUATION FOR WOMEN'S THIN-DRESS FABRICS.....	5
CHAPTER II. SELECTION OF THE STANDARD SAMPLES FOR HAND EVALUATION	
1. Standard of the hand for men's suit fabrics.....	7
1.1 Selection of important hand-expressions.....	7
1.2 The coordinated feeling of each of the expressions.....	7
1.3 Detremination of the standard samples.....	8
1.4 Standard samples.....	14
1.5 Reproduction of the standard samples	15
1.6 The Second edition of THE H.E.S.C. STANDARD OF HAND EVALUATION	16
2. Standard of the hand for women's dress fabrics	17
2.1 Classification of the women's dress fabrics	17
2.2 Selection of primary hand for women's dress fabrics.....	18

CHAPTER III. HOW TO USE THE HESC STANDARD FOR HAND EVALUATION

1. Evaluation of hand values (HV) using the standards	21
2. Application of hand values	24
3. Relation between the primary hand expressions and the "good hand feeling"	25
4. Total Hand Value	26

CHAPTER IV. MEASUREMENT OF THE MECHANICAL PROPERTIES OF FABRICS

1. Mechanical properties of fabrics which are related with the hand evaluation	28
2. The characteristic values	28
2.1 Tensile property	28
2.2 Bending property	30
2.3 Surface property	31
2.4 Shearing property	34
2.5 Compressional property	36
2.6 Thickness and weight	38
2.7 Summary	38
3. Preparation of samples	38
4. Measuring apparatus	39
5. KES-F system and KES-FB system	40
6. Charateristic values of the fabrics commercially produced for men's suit	51
7. Chart used for representing fabric character	57

CHAPTER V. ANALYSIS OF HAND EVALUATION

1. Translation formula from the characteristic values to the hand values	71
1.1 Preliminary researches	71
1.2 Development of the stepwise-block-regression method	74
2. Comparison between the calculated and experimental hand values	84

3. Analysis of the hand evaluation of the experts	86
4. Calculation of THV.....	89
5. Discriminant analysis.....	91
CHAPTER VI. HAND EVALUATION IN FUTURE	94
REFERENCES	95

5. KES-F system and KES-FB system

In 1973, the KES-F system was completed by the present author. The KES-F system (Kawabata's evaluation system for fabrics) is consisted of four machine-blocks such as Table 4-1. The KES-FB which has been developed recently is also same system as KES-F system shown in Table 4-1, and some improvements have been made in the mechanism of each of the machines.

Table 4-1 KES-F System

Machine block	Use	Characteristic values measured
KES-F-1	Tensile and shearing testing	<i>LT, WT, RT, G, 2HG, 2HGS</i>
KES-F-2	Pure bending testing	<i>B, 2HB</i>
KES-F-3	Compressional testing	<i>LC, WC, RC, T</i>
KES-F-4	Surface testing	<i>MIU, MMD, SMD</i>

Remark: KES-FB System is also consisted of the four machines same as above.

Each of the machine blocks is connected with a main-amp-block shown in Fig. 4-12 and, if necessary, with a computing block as shown in Fig. 4-11. We can set up the system also such that these four machine blocks possess one main-amp-block and one computing block in common.

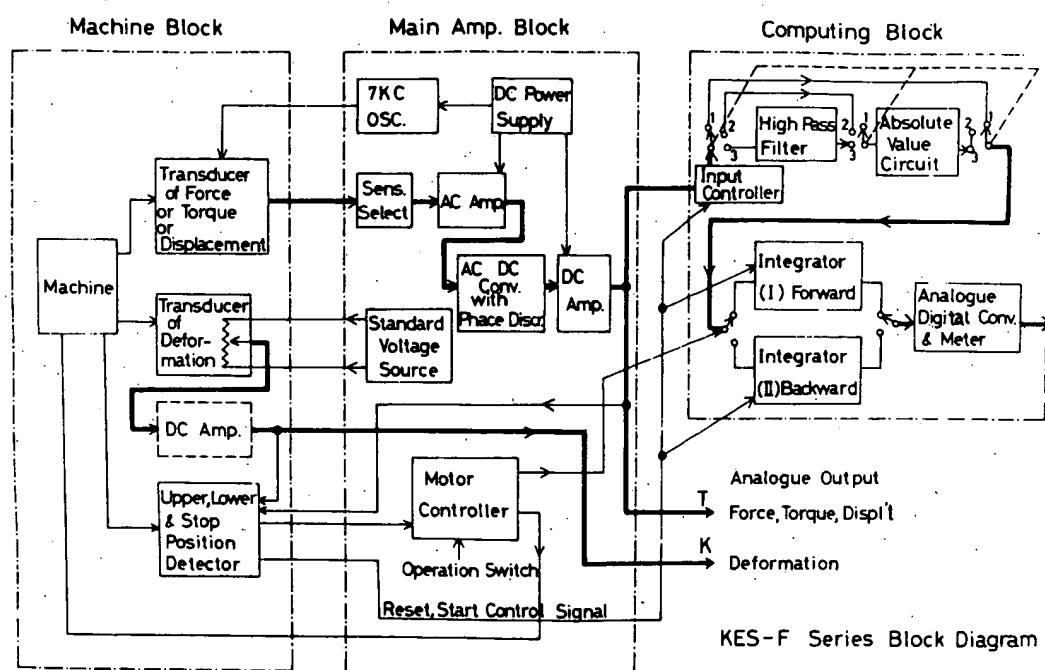


Fig. 4-11 KES-F and KES-FB systems. Thick line shows the flow of the signal.

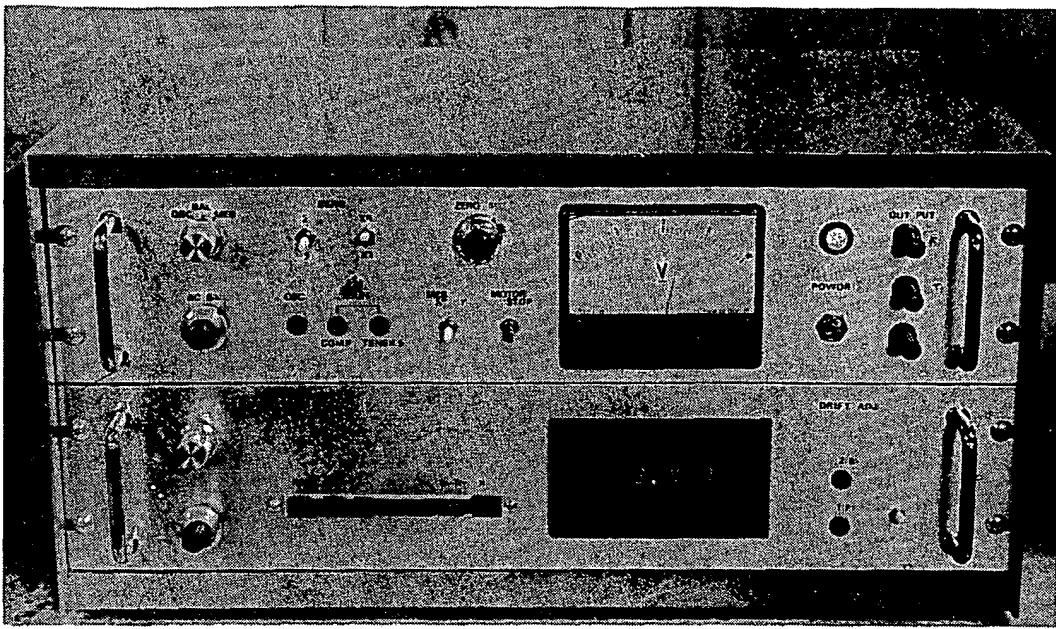


Fig. 4-12 Amp. and computing block of KES-F and KES-FB systems.

1) KES-FB1

Fig. 4-13 is the appearance of KES-FB-1. A specimen is crimped by two chucks of 20 cm long, as shown in the figure. One of the chucks is mounted on a sliding base, and stretches the specimen by the movement of the sliding base to backward direction. Tensile force is detected by measuring the torque of the drum and tensile strain by the displacement of the sliding base as shown in Fig. 4-14. The deformation applied becomes approximately "strip biaxial deformation".

The force-strain curve obtained in this apparatus is shown in Fig. 4-15. The values of

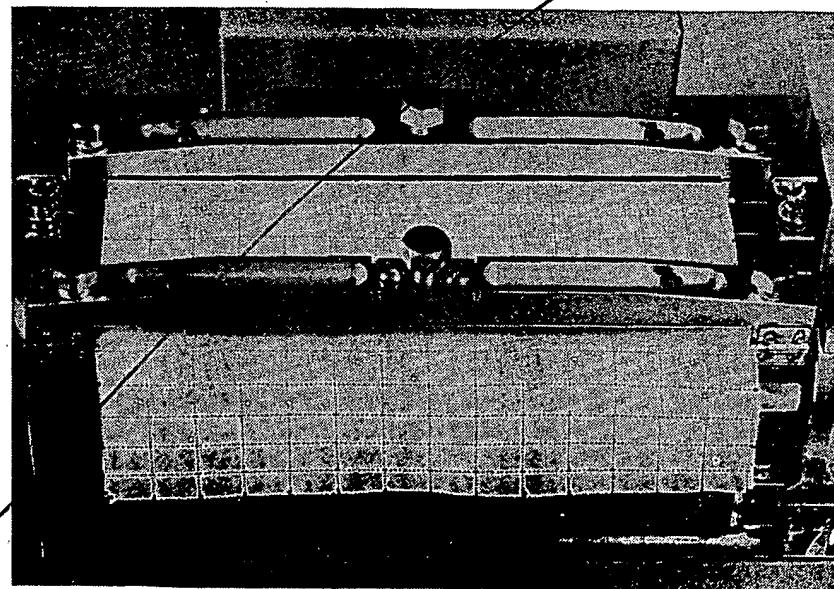


Fig. 4-13 Tensile testing by KES-FB1

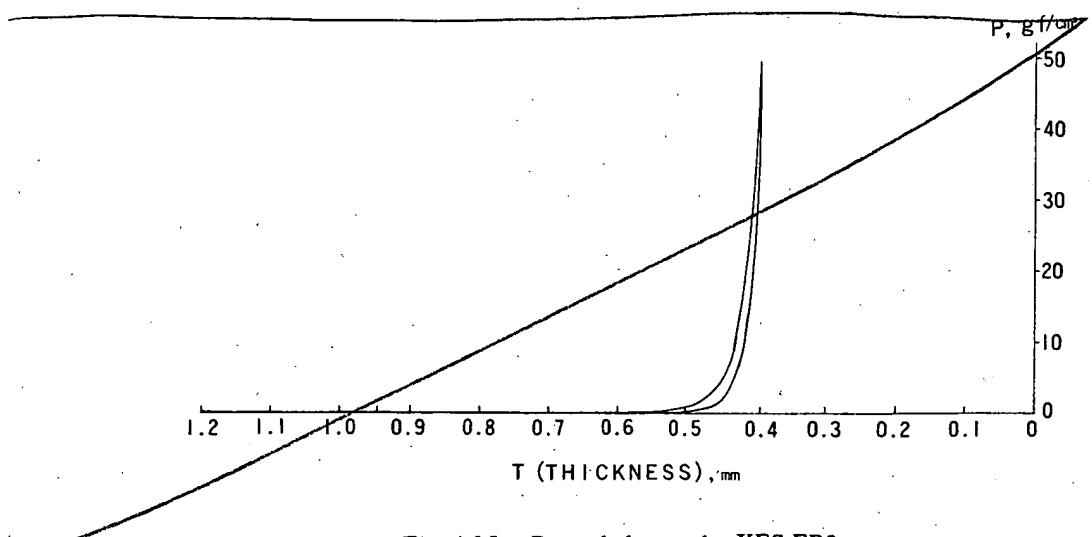


Fig. 4-25 Recorded curve by KES-FB3.

4) KES-FB4

The measurements of the surface roughness and surface friction are shown in Fig. 4-26 (a). The specimen is moved from left to right by a rotating drum on which one end of the specimen is fixed and then from right to left after that. The another end of the specimen is crumpled by a swing lever to give tension on the specimen. The detector of the roughness coming down from the upper part touches on the specimen under the standardized condition. The up and down displacement of this detector caused by roughness of the

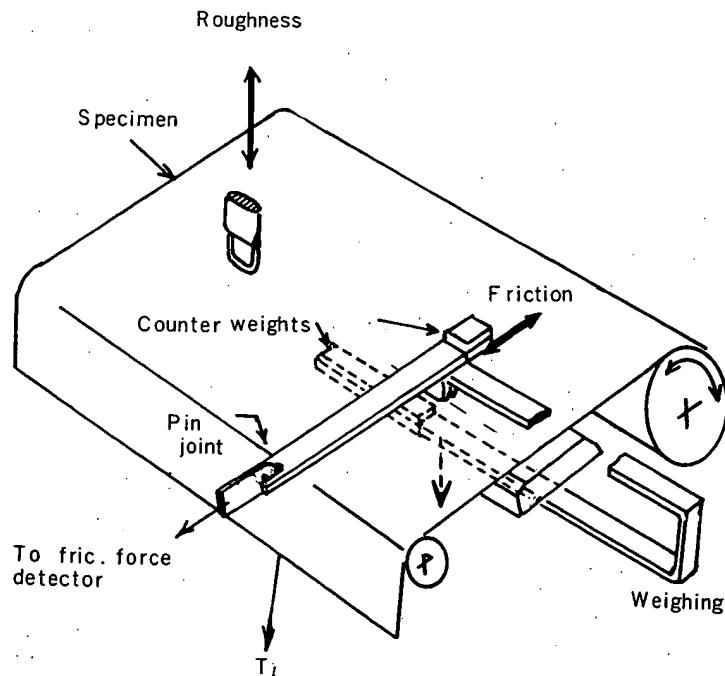
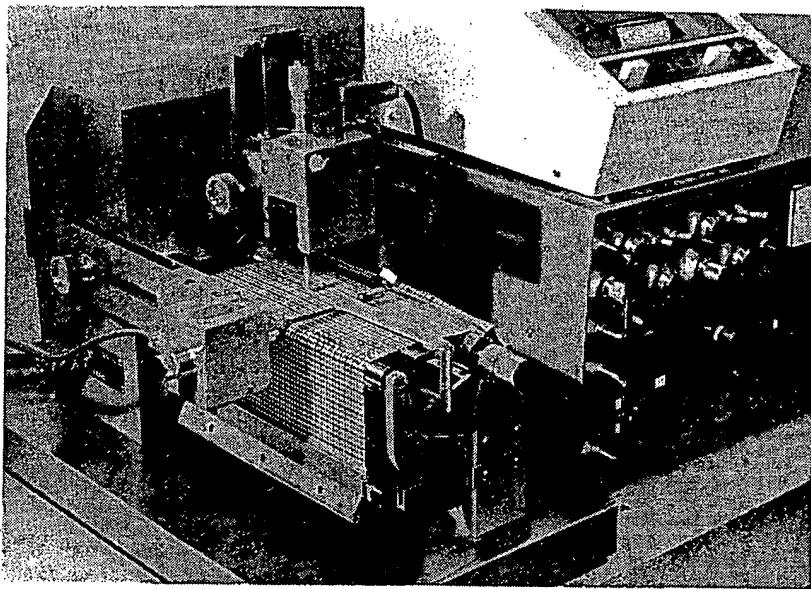
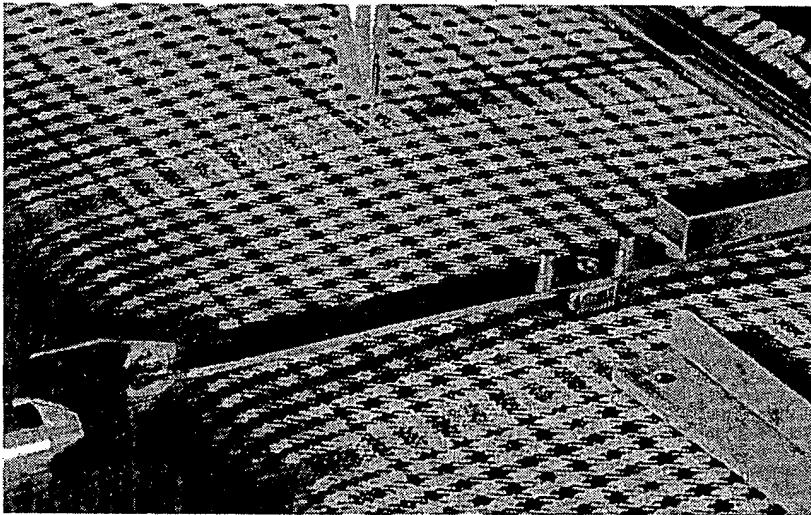


Fig 4-26 (a) Principle of the surface testing.



(b)



(c)

Fig.4-26 (b) and (c) Surface tester, KES-FB4. The surface roughness and surface friction are being measured at same time. Appearance (b), close up of the contact portion (c). The weight lever is dismounted from the friction contactor to show the contact portion clearly. This photo is taken from same angle as drawing of Fig.4-26 (a).

specimen is transduced to the electric signal by a linear-transformer put at up-ends of the detector. The signal from the transducer is passed the filter having prescribed frequency response and integrated to compute *SMD*.

Fig. 4-26 (a) shows also the testing of surface friction using same apparatus with a different detector. The detector (front side) is connected by a free joint with the end of the transducer which detects the frictional force picked up by the detector. The surface of the detector is shown in Fig. 4-27. The contact pressure is given by a stable

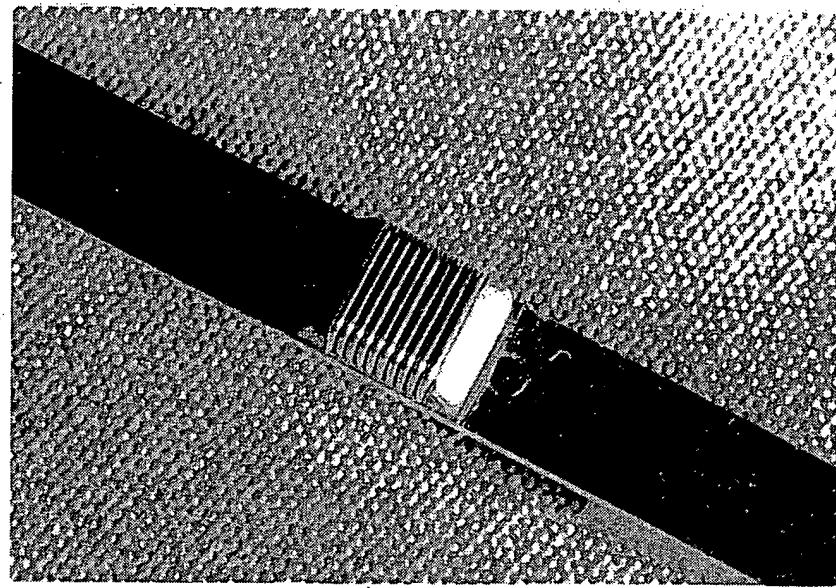


Fig. 4-27 Surface of the contactor used for surface friction testing.

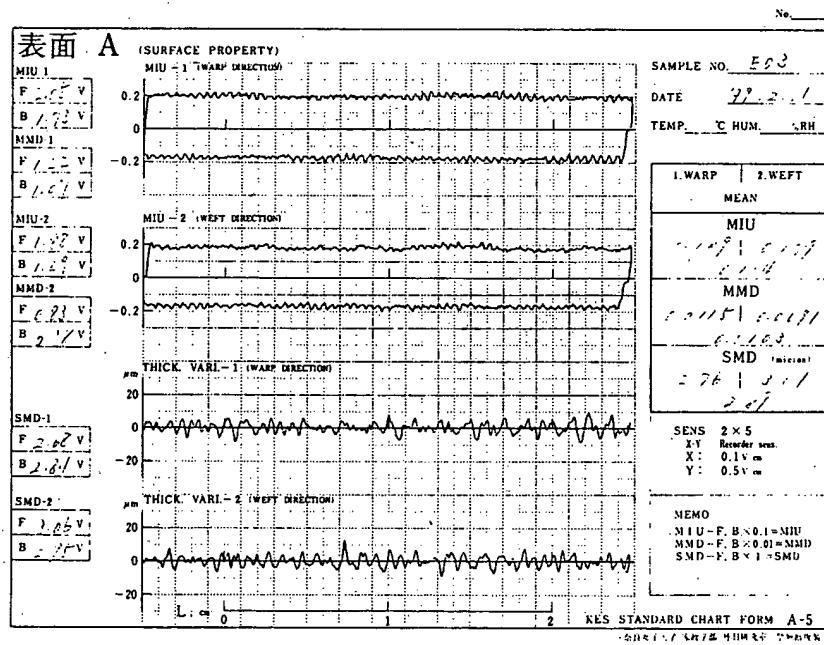


Fig. 4-28 Recorded curves of surface friction (upper two curves), two curves corresponds to warp and weft directions respectively and each curve is consisted of going and returning processes. Recorded curves of surface roughness (lower two).

balance where its gravitational center lies lower than the contact surface. Fig. 4-28 is the recorded curves of the friction and the roughness respectively. *MIU*, *MMD* and *SMD* of these curves are calculated in the computing block and indicated their values by digital meter.

Now this system has been used in many companies and laboratories in Japan. The first system is placed in Nara Women's University and Dr. Niwa who is a staff of the university has measured many samples of which hand values have been evaluated by experts in the committee and obtained useful data for the analysis of the expert's hand as described next chapter. The following leading textile companies, Toray Industries, INC., Kuraray Co., LTD., Kanebo Co., LTD., and Kao Soap Co., LTD. also assisted the measurement by using their KES-F systems in the earliar stage of this research.

6. Characteristic values of the fabrics commercially produced for men's suit.

The histograms from Fig. 4-29 to Fig. 4-45 show the distribution of each of the sixteen characteristic values, including those of ϵ_m as a related value, for the samples selected as following manner.

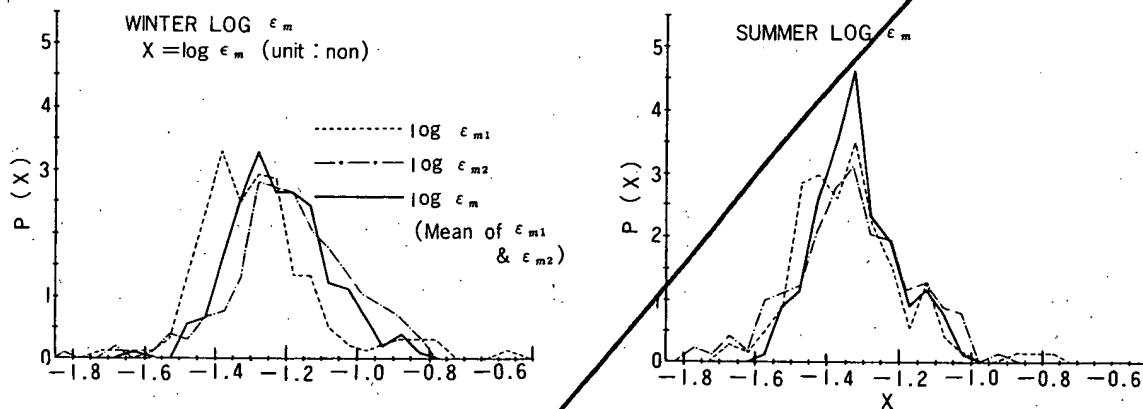


Fig. 4-29 Distribution of ϵ_m .

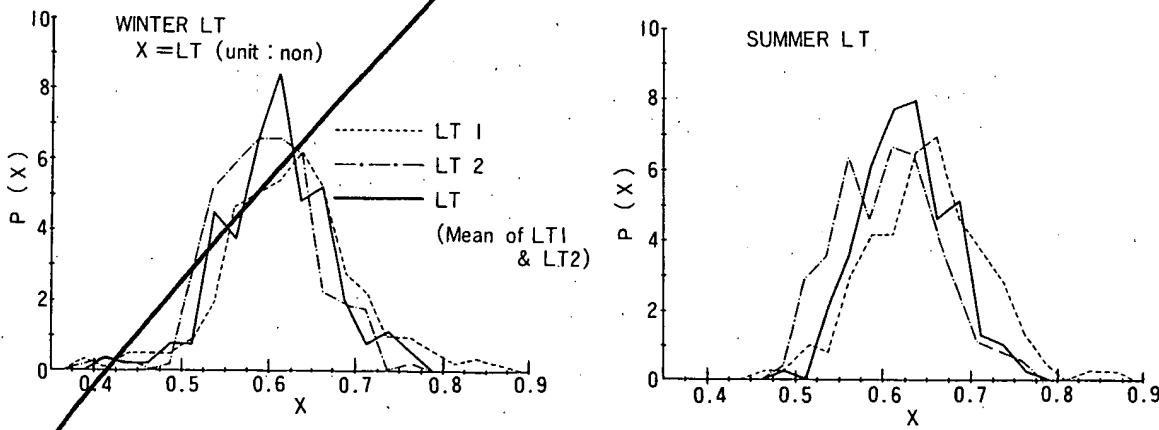


Fig. 4-30 Distribution of LT .

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JIS

This standard was revised in 2, 1994

JAPANESE INDUSTRIAL STANDARD

**Grey Scale for Assessing
Change in Colour**

JIS L 0804-1983

Translated and Published

by

Japanes Standards Association

Translation without guarantee

**In the event of any doubt arising, the original
standard in Japanese is to be evidence**

1. Scope

This Japanese Industrial Standard specifies the grey scale to be used as the standard for assessing visually change in colour of test specimens yielded by colour fastness test, hereinafter referred to as the "grey scale".

2. Summary

This standard gives the requirements for the construction, dimensions and quality of the grey scales and provides the colour measurement and the inspection thereof.

3. Definition

The principal terms used in this standard are as defined below.

- (1) achromatic colour Colour without hue; as defined in JIS Z 8105.
- (2) colour difference based on $L^*a^*b^*$ system (ΔE^*_{ab}) Value obtained by colour measurement made in accordance with 4. or 5. of JIS Z 8722 and by calculation thereafter made in accordance with 6.1 of JIS Z 8730 using the values $X_{10}Y_{10}Z_{10}$ under the standard illuminant D_s.
- (3) colour difference based on Adams-Nickerson's colour difference formula (ΔE_{AN}) Value obtained by colour measurement made in accordance with 4. or 5. of JIS Z 8722 and by calculation thereafter made in accordance with 6.3.1 of JIS Z 8730 using the values XYZ under the standard illuminant C.

Applicable Standards:

JIS Z 8105-Glossary of Colour Terms

JIS Z 8721-Specification of Colours According to Their Three Attributes

JIS Z 8722-Methods of Measurement for Colour of Reflecting or Transmitting Objects

JIS Z 8730-Method for Specification of Colour Differences for Opaque Materials

Reference Standard:

ISO 105/A.02 Grey scale for assessing change in colour

4. Colour of Chips

4.1 The chips a_5 and b_5 of rating No. 5 and the chips a_{4-5} , a_4 , a_{3-4} , a_3 , a_{2-3} , a_2 , a_{1-2} and a_1 of rating Nos. 4 - 5 to 1, shown in Fig. 1, shall be of achromatic colour, and shall, at the same time, have $12 \pm 1\%$ in value Y of colour stimulus specification.

4.2 The chips b_{4-5} , b_4 , b_{3-4} , b_3 , b_{2-3} , b_2 , b_{1-2} and b_1 of rating Nos. 4 - 5 to 1 shall be of achromatic colour showing more reflectance than that of each contiguous chip.

4.3 There shall be presented the colour difference specified in Table 1 or 2 between two chips consisting each pair of rating Nos. 5 to 1.

4.4 All chips shall have no fluorescence and shall scarcely show gloss and change with the passage of time.

4.5 The surface of the body other than that of chips as well as that of mask shall be approximately N 2.5 in specification of achromatic colour specified in JIS Z 8721.

Table 1. Colour Difference Between Two Chips of Each Rating (ΔE^*_{ab})

Rating (No.)	Colour difference
5	0 + 0.2
4 - 5	0.8 ± 0.2
4	1.7 ± 0.3
3 - 4	2.5 ± 0.35
3	3.4 ± 0.4
2 - 3	4.8 ± 0.5
2	6.8 ± 0.6
1 - 2	9.6 ± 0.7
1	13.6 ± 1.0

Table 2. Colour Difference Between Two Chips of Each Rating (ΔE^*_{ab})

Rating (No.)	Colour difference
5	0 + 0.2
4 - 5	0.75 ± 0.2
4	1.5 ± 0.2
3 - 4	2.25 ± 0.2
3	3.0 ± 0.2
2 - 3	4.25 ± 0.3
2	6.0 ± 0.5
1 - 2	8.5 ± 0.7
1	12.0 ± 1.0

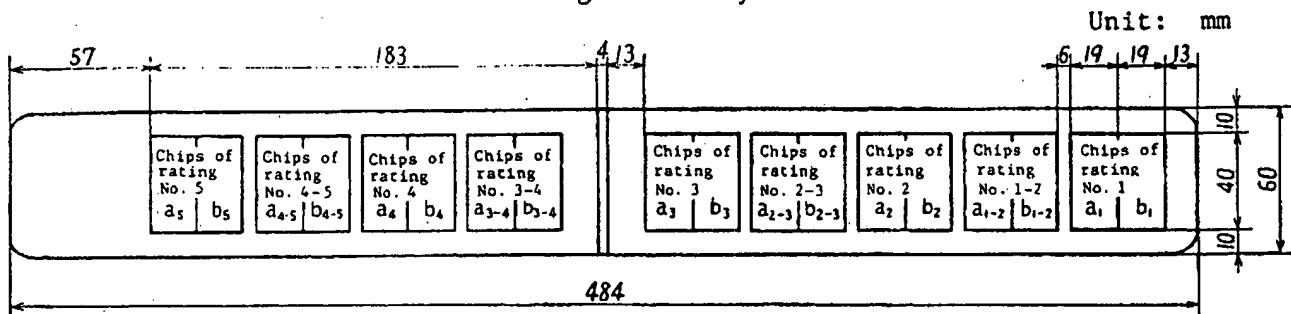
5. Construction, Shape and Dimensions

5.1 The grey scale shall consist of a plate of body and its mask.

5.2 There shall be presented nine-stepped colour difference of rating Nos. 5 to 1 with nine pairs of colour chips on the surface of the body, as shown in Fig. 1.

5.3 The colour chips showing a rating shall consist of a pair of colour chips a and b placed contiguously to each other.

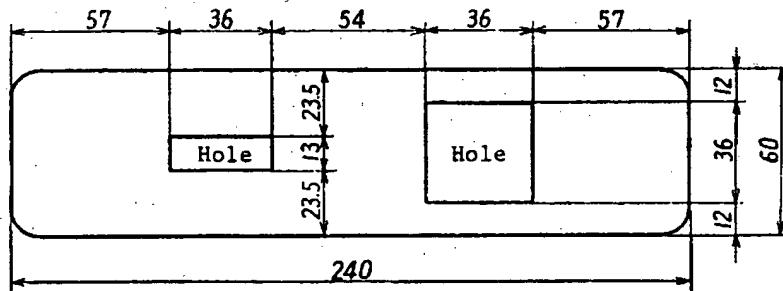
Fig. 1. Body



5.4 The shape and dimensions of the mask shall be as specified in Fig. 2.

Fig. 2. Mask

Unit: mm



6. Appearance

The grey scales shall be free from such defects as enumerated below.

- (1) Unevenness of colour on the chips,
- (2) Staining and rubbing flaw on the chip surface,
- (3) Immoderate conspicuousness, obscurity or overlap along the contact line of two chips of a rating,
- (4) Immoderateness or unevenness of colour and condition on the surface of the mask, and
- (5) Presence of any colour, different from that of the mask surface, at the cut section surrounding the holes.

7. Colour Measurement

The colour measurement to be made for the chips shall follow the method specified in 4. or 5. of JIS Z 8722.

8. Inspection

The inspection of the grey scales shall be made on the requirements specified in 4., 5. and 6. above.

Reference: The grey scales for assessing change in colour are available at Japanese Standards Association.

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